Q-TUNE-IR

AIR COOLED, DIODE PUMPED, TUNABLE WAVELENGTH Q-SWITCHED LASER FOR INFRARED SPECTROSCOPY

FEATURES

Seamless laser and Optical Parametric Oscillator (OPO) integration

Remote control via PC

Turnkey performance due water-free pump laser design

Guaranteed **> 2 Gshot** pump diode lifetime

Microprocessor controlled operation with self-optimisation, self-calibration capability

Hands-free, automated tuning from **1380** to **4500 nm**

> 17 mJ pulse energy at the peak of tuning curve

< 10 cm^{-1} linewidth (broadband **~200 cm^{-1}** version is available)

Up to **20 Hz** pulse repetition rate

Internal or external triggering modes

Separate output port for access to pump laser beam

Low power consumption – from 50 to 100 W depending on model

Can be powered from +12 VDC or +28 VDC source

APPLICATIONS
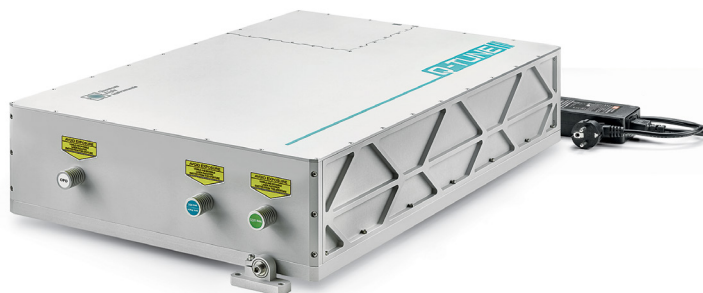
Infrared spectrophotometry

Cavity ring-down spectroscopy

Gas spectroscopy

Single molecule vibrational spectroscopy

Scanning near-field optical microscopy

Remote sensing

Quantum Light Instruments

Q-TUNE-IR is a high peak power coherent light source for infrared spectroscopy, infrared spectrophotometry, metrology, single molecule vibrational microscopy, remote sensing.

Q-TUNE-IR is using Optical Parametric Oscillator (OPO) to produce tunable wavelength in **1380 – 4500 nm** range with linewidth less than **10 cm^{-1}**. Broadband version with linewidth up to 200 cm^{-1} is available by request.

There two types of OPO coatings available. The first one is optimized for maximum transmission in 2.1 μm range (option -TC1). The second one is optimized for maximum transmission in 3.3 – 3.9 μm range (option -TC2). See typical tuning curves in picture below for comparison.

QLI breakthrough water-free laser crystal pumping technology allows to produce high quality pumping beam with up to 100 mJ pulse energy. There are no chillers or bulky power supplies that one needs to fit under the table. All laser electronics are integrated into housing of the Q-TUNE-IR and the only external module is mains adapter that provides 12 or 28 VDC, 50 – 150 W power (depending on model).

Both pump laser and OPO are controlled through single Ethernet port via build-in web-server. There is no need to install control software – any computer or even cell phone with modern web-browser will be able to control Q-TUNE-IR. API is also provided for integration with user devices. In addition to tunable wavelength output, the Q-TUNE-IR provides an extra port for the access to pump laser beam.

Optional extensions available by request:

› Compact spectrometer for OPO wavelength and linewidth monitoring.

› Build-in attenuator for pulse energy control.

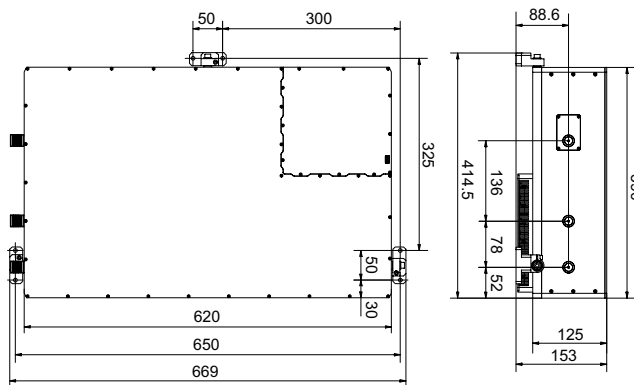› Air purging for removal of water vapor absorption lines and improved lifetime of optics.

SPECIFICATIONS [1)]

MODEL	Q-TUNE-IR				
	-C10	-C100	-E33	-F10	-F20
Wavelength range, nm [2)]	1380 – 4500 nm				
Pulse repetition rate [3)]	10 Hz	100 Hz	33 Hz	10 Hz	20 Hz
Pulse energy [4)]					
-TC1	≥ 1.5 mJ	≥ 1 mJ	≥ 3 mJ	≥ 5 mJ	≥ 4 mJ
-TC2	≥ 2 mJ	≥ 1.3 mJ	≥ 4 mJ	≥ 6 mJ	≥ 5 mJ
Linewidth [5)]	< 10 cm^{-1}				
Pulse duration [6)]	3 – 4 ns typical				
Pulse-to-pulse stability [7)]	< 4.5 % RMS				
Power drift [8)]	± 3.0 %				
Polarization	horizontal, linear				
Typical beam diameter [9)]	3 mm		5 mm	6 mm	
Typical beam divergence [10)]	< 7 mrad		< 5 mrad		
Jitter [11)]	< 0.5 ns RMS				

PUMP LASER OUTPUT

Max pulse energy at fundamental wavelength [12)]	20 mJ	14 mJ	50 mJ	80 mJ	60 mJ

DIMENSIONS

Laser head (W×L×H)	390× 620 × 153 mm³
Power adapter (W×L×H) [13) 14)]	192 × 178 × 46 mm³
Air purging unit (W×L×H) [15)]	422 × 460 × 89 mm³

OPERATING REQUIREMENTS

Cooling requirements	Air cooled (water-free)				
Ambient temperature	15 – 30 °C				
Relative humidity (non-condensing)	10 – 80 %				
Mains voltage	90 – 230 VAC, single phase, 47 – 63 Hz [14)]				
Average power consumption	< 50 W	<150 W		<80 W	< 120 W

[1)] Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at 3300 nm and max pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.

[2)] There are two wavelengths at the exit port in 1800 – 2500 nm range corresponding to signal and idler of OPO. Configurations for single wavelength output and/or no gap in 2800 – 2900 nm range are available. Please inquire for details.

[3)] Factory-set pulse repetition rate in internal triggering mode. Pulse repetition rate can be divided-down to 1 Hz.

[4)] Pulse energy @3300 nm. See tuning curves for typical pulse energies at other wavelengths.

[5)] Broadband version is available, with linewidth up to 200 cm^{-1}. Please inquire for details.

[6)] FWHM level at 1550 nm, measured with 350 ps rise time photodiode.

[7)] Measured during 30 seconds operation after warm-up.

[8)] Over 8 hour period after 20 minutes of warm-up, when ambient temperature variation is less than ±2 °C. Power value is calculated every 1 second.

[9)] Beam diameter is measured 20 cm from laser output at the 1/e² level at 1550 nm.

[10)] Full angle measured at 1550 nm at the 1/e² level.

[11)] In respect to falling edge of pump diode triggering pulse.

[12)] Laser pulse energy is optimized for OPO pumping may differ from stand-alone laser specifications indicated here.

[13)] Power adapter size depends of Q-TUNE-IR model.

[14)] Laser can be powered from appropriate 12 or 28 VDC power source, depending on model. Please inquire for details.

[15)] Air purging unit is supplied with integrated power adapter.

DANGER

VISIBLE AND/OR INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO DIRECT REFLECTED OR SCATTERED RADIATION

Tunable; 1380 – 4500 nm
Max. 80 mJ, pulse 3 – 4 ns typical
LD 800 nm, max 1000 W
CLASS IV LASER PRODUCT

Dimensional drawing of Q-TUNE-IR (in mm)
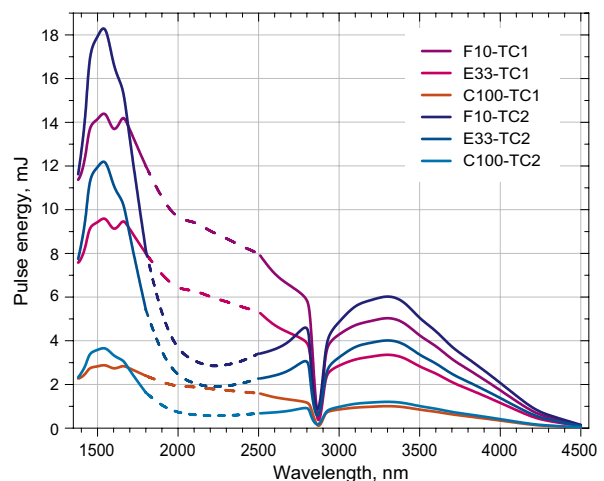
Typical Q-TUNE-IR tuning curves. Dashed lines shows range where signal and idler waves are unseparated